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A RECOMMENDED STANDARD AIR POLLUTION INDEX

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ABSTRACT

A candidate standard air pollution index has been developed for use by State and local air pollution control agencies in reporting daily air quality conditions to the news media and the public. The proposed index, which was developed in consultation with State and local agencies, is based on the National Ambient Air Quality Standards and the Federal Emergency Episode Criteria. The index is a segmented linear function which utilizes the highest observed concentrations of each pollutant for the daily calculation of nondimensional numerical index values. Index values are cross-referenced to descriptor words which reflect the health effects implications of the measured pollution levels. A flexible reporting scheme and methods for conveniently calculating the index are described.

I. INTRODUCTION

The need for a uniform national air pollution index has been noted in several recent reports.[1-4] Although the literature reveals a variety of attempts to develop candidate uniform air pollution indices,[5-7] none of these indices has received acceptance by State and local air pollution control agencies, probably because none has received the active support or endorsement of the Federal Government. We report here the recent progress[8] toward a uniform national air pollution index, including the development and selection of the current index proposal, its structure, and prospects for implementation.

The current index proposal,[9] as developed by the U.S. Environmental Protection Agency's (EPA) Working Group to Develop an Air Quality Index, is

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based on an earlier version.[10] The candidate index, the Pollutant Standards Index (PSI), was provided to the Federal Task Force on Air Quality Indicators in February 1976, and provides the basis for this report. The index is currently under extensive review by State and local governments, the State and Territorial Air Pollution Program Administrators, the Association of Local Air Pollution Control Officials, the EPA Regional Offices, and the print and broadcast media. The index is, therefore, subject to change based on the reviewers' comments once they have been received and considered.

II. DEVELOPMENT AND SELECTION OF A STANDARD AIR POLLUTION INDEX

When faced with the problem of designing a uniform index, it is necessary to note that today's indices form a continuum in terms of their complexity. The simplest, at one end of this continuum, reports the raw concentration data--for example, 0-3 parts-per-million (ppm) carbon monoxide (CO) as "good," 3-15 ppm CO as "satisfactory," and 15-40 ppm CO as "unsatisfactory." Other pollutants (sulfur dioxide, nitrogen dioxide, oxidant, total suspended particulate) would be reported in a similar manner. Such an index is very straightforward in its design. At the other end of the continuum are combined indices, the most complex of which include exponents and weighting factors.

The simple, raw data indices would be acceptable if the public were fully acquainted with the different pollutants and the scientific units in which their concentrations are expressed. Possibly, the public's level of understanding of environmental phenomena will one day reach such an advanced state that concentration units alone would be sufficient. The ubiquity of dimensionless air pollution indices, however, suggests that both the news media and the public in general seek a more parsimonious and understandable

index form than one in which pollutant concentration units must be explained. The ultimate design goal of most air pollution indices appears to be to express the general "level of contamination," in the form of a single number which is based on all the pollutants. The need for parsimony is particularly evident where air pollution indices are reported on the radio or television. Here, the reporter has little time to discuss the nature of the pollutants or explain what is meant by ppm of CO or micrograms-per-cubic-meter ($\mu g/m^3$) of total suspended particulate. Thus, index development, if it is to be successful, must strive toward parsimony.

Unfortunately, the more parsimonious the form, the more it is necessary to factor out the many fine details that give a true picture of air quality. The result is to introduce arbitrary assumptions of questionable validity. The most extreme distortion of this kind occurs with the combined indices, particularly if they include nonlinear terms. Because one number is reported, combined indices give the impression that they are "simple," but the many gross assumptions that are necessary distort the picture of air quality they represent. For example, CO has a very different kind of effect on public health than sulfur dioxide (SO_2) or oxidant. If these three pollutants are combined in the same equation, what weighting should be given to each? How should their concentrations be manipulated? A particularly objectionable form of distortion is the "eclipsing" phenomenon that occurs in combined indices as described in a compendium[11] prepared by the Council on Environmental Quality and EPA. Here, one of the pollutants may exceed a National Ambient Air Quality Standard (NAAQS)[12] without the index ever exceeding its critical value of 100. This makes the index value ambiguous and difficult to interpret, for a threat to public health may exist without the index fully responding. Thus, combined indices are complex in design but give a "simple" result that is often very difficult to interpret.

The most suitable candidate for a uniform air pollution index probably lies somewhere between the two extremes of raw concentration data on all pollutants and combined, nonlinear indices. If a successful candidate is to be found for a recommended nationally uniform air pollution index, the best place to look is the State and metropolitan agencies already using indices. By comparing and evaluating the many indices currently in existence, a pattern should emerge of the optimum characteristics that such a uniform index should possess.

With the data base and analysis provided by the Compendium,[11] it was possible to determine the most frequently encountered characteristics of the indices currently used by air pollution control agencies (Table I). This Table shows that an index which closely resembles that of the greatest number currently in use would (1) be based on the five NAAQS pollutants (excluding hydrocarbons), (2) be a segmented linear function, (3) be calculated using the maximum mode, and (4) have four descriptor categories based on the NAAQS[12] and episode criteria, using the more frequently occurring words such as "good," "moderate," "unhealthy(ful)," and "unsatisfactory."

The use of the NAAQS[12] and Federal Episode Criteria[13,14] as a primary basis for a uniform index is further supported by an analysis[15] of the State air quality standards and episode criteria. Currently, as many as 86 percent (Table II) of the State standards and 75 percent (Table III) of the State Episode Criteria are based on the NAAQS and Federal Episode Criteria. In fact, the NAAQS for SO_2, which has the lowest adoption rate, is used by 50 percent of the States, while nearly 75 percent of the remaining State air quality standards and episode criteria are based on the Federal levels. Thus, these Federal levels provide a convenient, uniform basis for developing a national air pollution index.

TABLE I

SUMMARY OF PREFERRED STRUCTURAL CHARACTERISTICS OF THE INDICES IN 35 AGENCIES

STRUCTURAL CHARACTERISTIC	PREFERRED STRUCTURE	NUMBER OF AGENCIES	PERCENT
NUMBER OF VARIABLES	5	13	37
CALCULATION METHOD	B. SEGMENTED LINEAR	13	37
CALCULATION MODE	2. MAXIMUM	15	43
DESCRIPTOR CATEGORIES	B. STANDARDS AND EPISODE CRITERIA	19	54
NUMBER	4	8	23
	3	7	20
WORDS	GOOD	10	36[a]
	MODERATE	7	26[a]
	UNHEALTHY(FUL)	7	22[a]
	UNSATISFACTORY	7	21[a]

[a]PERCENT USE IN 28 INDICES.

TABLE II

BASIS FOR STATE AMBIENT AIR QUALITY STANDARDS

POLLUTANT	FEDERAL NAAQS	STATES WITH FEDERAL NAAQS		STATE WITH STATE AAQS	
CO	9ppm – 8 hr	43	86%	7	14%
SO_2	0.14ppm – 24 hr	25	50%	25	50%
TSP	75 & 60 $\mu g/m^3$ – 1 yr 260 & 150 $\mu g/m^3$ – 24 hr	36	72%	14	28%
Ox	0.08ppm – 1 hr	38	76%	12	24%

TABLE III

BASIS FOR STATE EPISODE CRITERIA

	STATES WITH FEDERAL CRITERIA		STATES WITH NO CRITERIA		STATES WITH COMBINED FEDERAL–STATE CRITERIA		STATES WITH STATE CRITERIA	
ALERT	235	75%	35	11%	11	4%	33	10%
WARNING	221	70%	34	11%	7	2%	52	17%
EMERGENCY	237	69%	57	17%	10	3%	38	11%

The development of a standard index must also take into consideration the ten criteria, listed below, which resulted from a case study and agency comments collected during the Compendium survey:[11]

1. Easily understood by the public. The index should transform the scientific concentration units of each pollutant into a nondimensional number which is easily understood by the public. To facilitate comprehension of the index, the basis for the transformation should be identical for each pollutant and should relate to a nationally uniform set of air quality standards.

2. Includes major pollutants and capable of including future pollutants. The index should include all those pollutants which have been identified as major pollutants by the Federal Government and for which nationally uniform standards and episode criteria have been established. Furthermore, the structure of the index should be flexible so that when new pollutant standards are set they can be included in the index without modifying its basic form.

3. Relates to ambient air quality standards and goals. The index should relate to the NAAQS[12] which have been established for CO, SO_2, total suspended particulate (TSP), and oxidants. The index values should also be an indicator of the relationship between air pollution levels and these national air quality goals.

4. Relates to Federal Episode Criteria.[13,14] An additional basis for index should be the recommended Federal Alert, Warning, and Emergency Criteria, and the Significant Harm Levels, which have been established for CO, SO_2, TSP, nitrogen dioxide (NO_2), and photochemical oxidant. This will provide a uniform system of both public information and agency administrative procedures during air pollution episodes.

5. Calculated in a simple manner using reasonable assumptions. Pollutant concentrations should be easily convertible into their corresponding index

values using simple equations or appropriate plots of the index values vs. pollutant concentration. The index equation and/or curves should be based on the relationships described in Criteria 3 and 4.

6. Rest on a reasonable scientific basis. Because the index should relate to the NAAQS and Federal Episode Criteria (Criteria 3 and 4), its basis is as solid as the scientific basis on which the standards and episode criteria were established.

7. Not inconsistent with perceived air pollution levels. Index values become inconsistent with perceived air pollution levels when, in combined or aggregated indices, high pollutant concentration are "masked" by lower concentrations. To circumvent this problem, the index should calculate separate values for each pollutant, thus enabling each index value to be reported separately, if desired.

8. Spatially meaningful. The spatial meaningfulness of an index depends on how the data are selected or manipulated prior to the index computation. For example, the pollutant concentration may be averaged over several monitoring stations, or the highest pollutant concentration from any station in a city may be selected for the index calculation. The latter method should be used because it prevents the masking of high pollutant concentrations which occurs in the averaging process and allows index values to be associated with specific monitoring site locations.

9. Exhibits day-to-day variation. The structure of the index should allow for noticeable variation from day to day (and hourly if desired). When the index is calculated for each pollutant separately (Criterion 7) and the maximum value reported, variation also is possible in the pollutant reported. Combined indices do not possess these important characteristics. Reporting the maximum actual pollutant concentrations or the ratio of the pollutant

concentration to the NAAQS gives pollutant variation. However, because both of these systems report the index value as a fraction, neither exhibits the large numerical variation necessary for the values to be clearly understood by the public.

10. Can be forecast a day in advance (optional). When the index is based on the NAAQS and episode criteria (Criteria 3 and 4), the pollutant concentrations are determined using the Federal Reference Methods (FRM). However, the FRM method for TSP requires a 24-hour averaging time. This prevents the index from being reported more frequently than once every 24 hours. More current information, or even index forecasts, is of much greater interest and use to the public. More current index values can be obtained using other equivalent FRM monitoring methods having shorter averaging times. A 24-hour index forecast will be difficult to make without extensive meteorological data, but qualitative index forecasting is possible using the National Weather Service's Operation Manual for Air Pollution Weather Forecasts.[16] This system can provide an 18-hour forecast of index values using the following word descriptors: "remain the same," "decrease," or "increase."

Three main candidate approaches to the index structure and its calculation were considered: (1) the index would report actual pollutant concentrations; (2) the index would be a linear function, simply reporting for each pollutant its percentage of the primary NAAQS; and (3) the index would be a segmented linear function with "breakpoints" at both the primary NAAQS and the Federal Alert, Warning, and Emergency Criteria, and Significant Harm Levels.

The first option, reporting the index in the scientific concentration units for each pollutant, was rejected early because the scientific units are not easily understood by the public, the index values often appear as decimal numbers, and the values are not intrinsically related to the NAAQS and Federal

Episode Criteria. Thus, although several agencies currently use this type of index, it was not considered as a suitable candidate standard air pollution index, because it was felt that greater user acceptance could be obtained with an index which transformed the pollutant concentrations into a non-dimensional number intrinsically related to the NAAQS.

The second option, the linear function (percent-of-standards index), was seriously considered as a possible candidate uniform index. However, this approach has the major disadvantage of not relating directly to the Federal Episode Criteria. Using the linear index function, as shown in Table IV, the NAAQS for each pollutant corresponds to an index value of 100. However, the Federal Alert, Warning, and Emergency Criteria, and Significant Harm Levels correspond to different index numbers for each pollutant. For example, the Alert Level would give 166.7 for CO, 214.3 for SO_2, and 144.2 for TSP. Thus, above the NAAQS value of 100, the index becomes very confusing and difficult for the public to understand. Furthermore, such an index hinders the development of a uniform system of public information and agency administrative procedures during air pollution episodes.

The third candidate approach, the segmented linear function, circumvents the problems encountered with the first two approaches (Table IV) and meets all of the criteria outlined in the previous section. Thus, the segmented linear function was chosen as the candidate approach for the standard index. Indices of this type, as shown earlier, are preferred by most agencies. As a result, this structure also appears to have the greatest chance for acceptance by State and local air pollution control agencies.

III. A CANDIDATE STANDARD AIR POLLUTION INDEX

The candidate Pollutant Standards Index (PSI), as presented here, is based on the structure proposed in the February 1976 draft guideline.[9]

TABLE IV

INDEX BREAKPOINTS VALUES FOR A LINEAR INDEX FUNCTION COMPARED TO A SEGMENTED LINEAR INDEX (PSI)

BREAKPOINT	CO	SO_2	TSP	Ox	PSI
0	0.0	0.0	0.0	0.0	0.0
PRIMARY NAAQS	100.0	100.0	100.0	100.0	100.0
ALERT	166.7	214.3	144.2	125.0	200.0
WARNING	333.3	428.6	240.4	500.0	300.0
EMERGENCY	444.4	571.4	336.5	625.0	400.0
SIGNIFICANT HARM	555.6	714.3	384.6	750.0	500.0

Number of Pollutants. PSI includes five pollutants: CO, SO_2, TSP, oxidants, and NO_2. The NAAQS, Federal Episode Criteria, and Significant Harm Levels exist for all five. In addition, one pollutant product, SO_2 x TSP, is included because it has both Federal Episode Criteria and a Significant Harm Level.[13,14] As with NO_2, which has no short-term primary NAAQS, the SO_2 x TSP product is only a part of the index structure when the Federal Episode Criteria or Significant Harm Levels are exceeded. The index is designed so that any pollutant identified in the future as requiring the NAAQS, Federal Episode Criteria, and Significant Harm Levels can be added without modifying the basic form of the index.

Calculation Method. A segmented linear function is used for relating air pollutant concentrations to the NAAQS, Federal Episode Criteria, and Significant Harm Levels. The relationships (breakpoints) are shown in Table IV. For example, PSI ψ equals 100 for each NAAQS, and ψ equals 500 for the Significant Harm Levels. Another breakpoint is added below the NAAQS at 50 percent of the primary NAAQS for each pollutant with the exception of TSP, where the secondary NAAQS is used. In the case of the oxidant Alert Level, a concentration of 400 $\mu g/m^3$ was chosen instead of the present Alert Level of 200 $\mu g/m^3$. This was done because current evidence suggests that a 400 $\mu g/m^3$ hourly average better represents the health effects advisory level than a 200 $\mu g/m^3$ hourly average.

Figure 1 shows the breakpoints plotted for CO, and Figure 2 shows the composite functions for all the pollutants, including the product of SO_2 and TSP. If new pollutants requiring NAAQS are adopted in the future, a new segmented linear function can be drawn to accommodate them.

Calculation Mode. Since each pollutant is examined separately by comparing its measured concentration with the NAAQS, the Episode Level, and the Significant Harm Level, each pollutant can be reported separately. At the

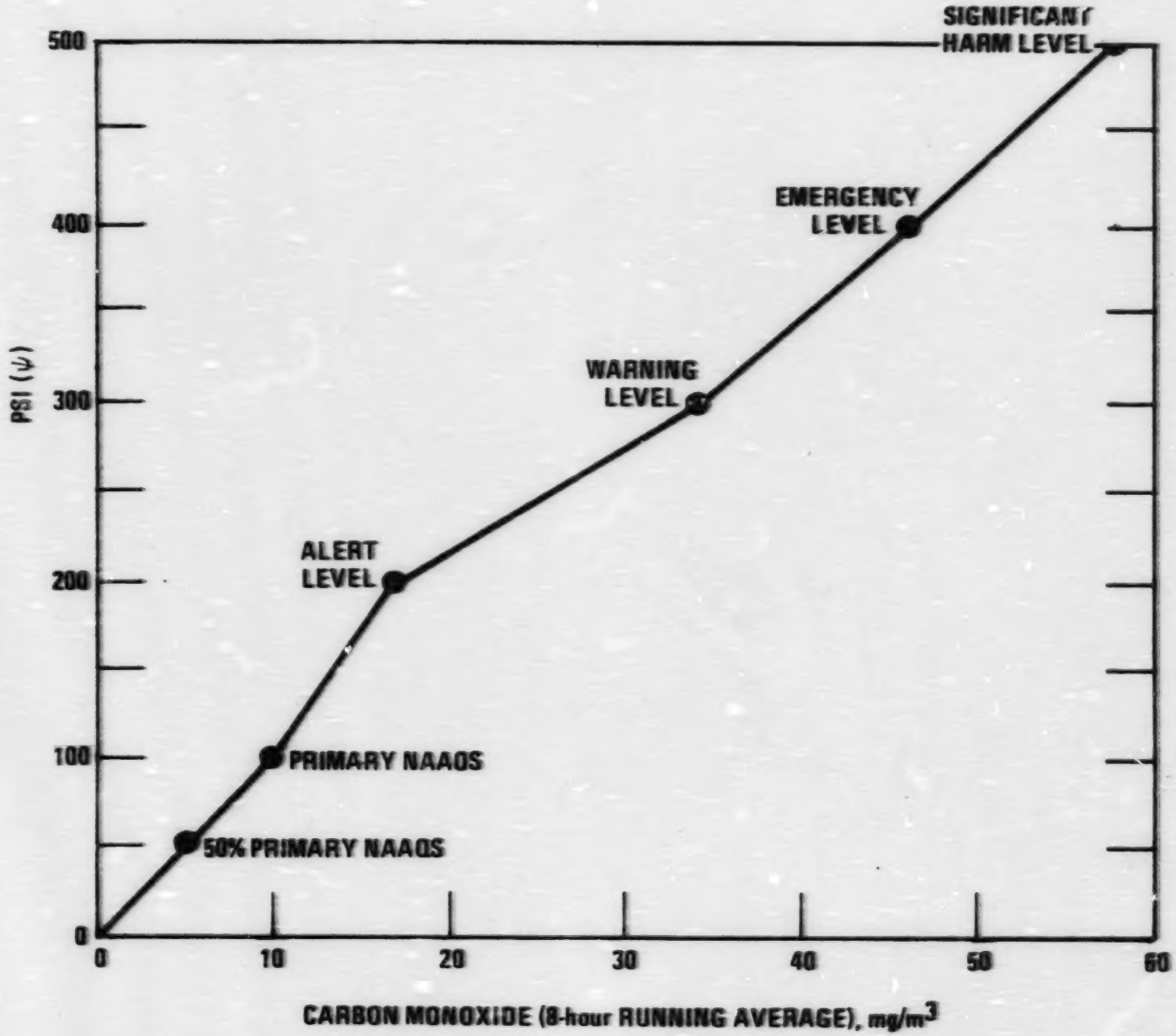


Figure 1. PSI function for carbon monoxide

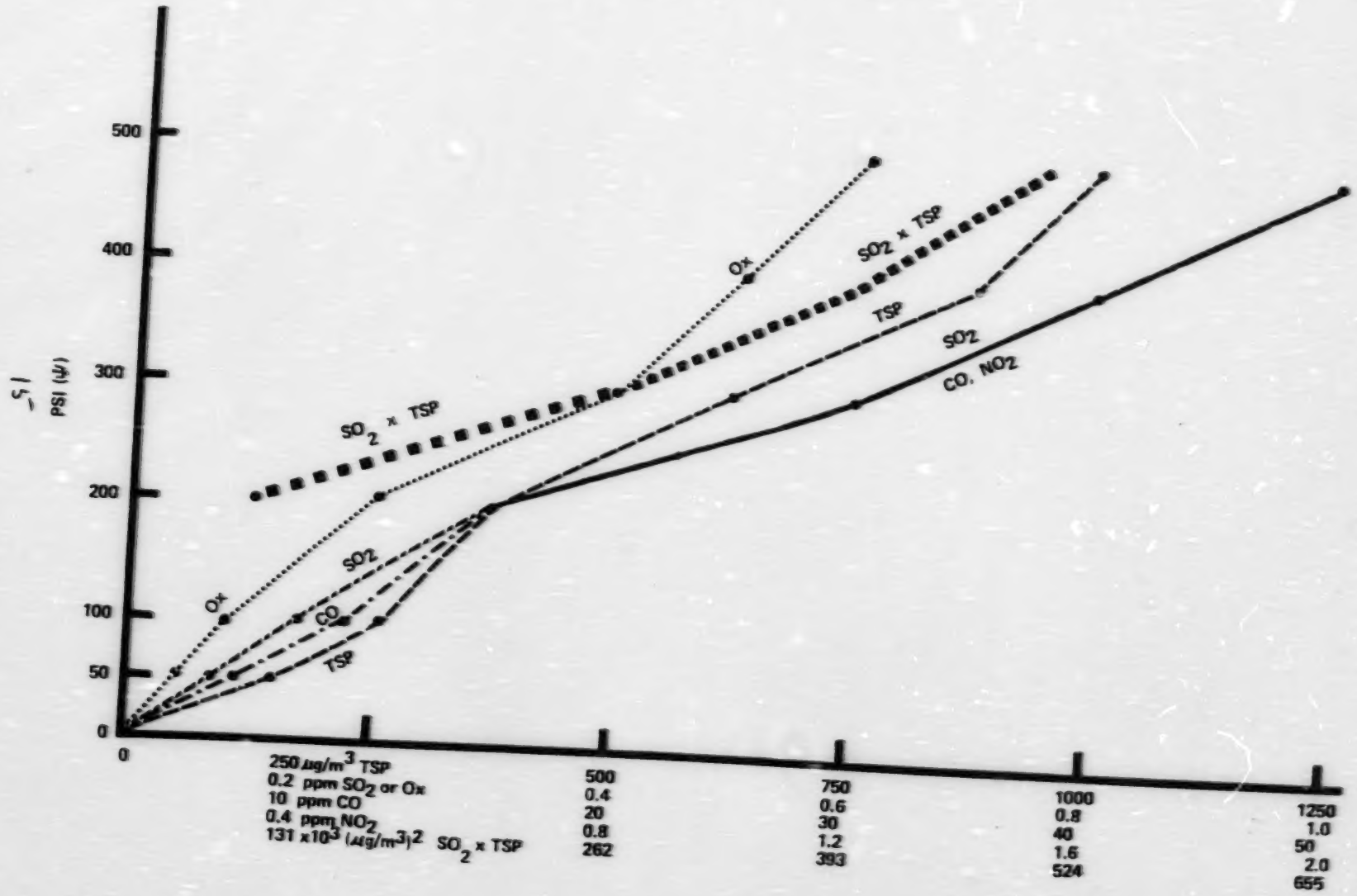


Figure 2. The PSI index functions

minimum, the pollutant with the highest index value should be reported to advise the public of the worst air pollution levels to which it is exposed. The index values of the other pollutants also should be reported, especially if any exceeds 100. When an air pollution level is reported as "potentially unhealthful," "unhealthful," "very unhealthful," or "hazardous," then cautionary statements and generalized health effects also may be used.

Descriptor Categories. Six descriptor categories are used: "good," "satisfactory," "potentially unhealthful," "very unhealthful," and "hazardous" (Table V). These categories are also related to generalized health effects language and appropriate cautionary statements developed from the Air Quality Criteria documents.[17-20] The air quality is rated "good" if the maximum air quality level of the pollutants being measured is below 50 percent of the primary NAAQS. A "satisfactory" rating applies between 50 to 100 percent of the primary NAAQS. In the case of TSP, the air quality is indicated as satisfactory from a health viewpoint if it is between the secondary and primary NAAQS. However, it is unsatisfactory from the standpoint of welfare effects such as visibility.

Air pollution levels between the NAAQS and the Alert Level for TSP, SO_2, and CO (and 400 $\mu g/m^3$ for oxidant) are deemed "potentially unhealthful," because moderate aggravation of respiratory symptoms in susceptible persons and irritation symptoms in the healthy population occur at these pollutant concentrations.[17-20] However, NO_2 and SO_2 x TSP do not have descriptor categories below the Alert Level, because they have no short-term NAAQS.[21] Air pollution concentrations above the Alert Level but below the Warning Level are classified as "unhealthful," while concentrations above the Warning Level but below the Emergency Level are "very unhealthful" and levels above the Emergency Level are "hazardous."

TABLE V

COMPARISON OF PSI VALUES WITH POLLUTANT CONCENTRATIONS, DESCRIPTOR WORDS, GENERALIZED HEALTH EFFECTS, AND CAUTIONARY STATEMENTS[9]

INDEX VALUE	AIR QUALITY LEVEL	POLLUTANT LEVELS					HEALTH EFFECT DESCRIPTOR	GENERAL HEALTH EFFECTS	CAUTIONARY STATEMENTS
		TSP (24-hour), $\mu g/m^3$	SO_2 (24-hour), $\mu g/m^3$	CO (8-hour), mg/m^3	O_3 (1-hour), $\mu g/m^3$	NO_2 (1-hour), $\mu g/m^3$			
							HAZARDOUS	Premature death of the ill and elderly, symptom interference with normal activity of healthy persons, and increased disability of the general population.	All persons should remain indoors, keeping windows and doors closed. Minimize physical exertion. Avoid driving.
500	SIGNIFICANT HARM	1000	2620	57.5	1200	3750			
							HAZARDOUS		
400	EMERGENCY	875	2100	46.0	1000	3000			
							VERY UNHEALTHFUL	Premature onset of certain diseases in addition to aggravation of symptoms and decreased exercise tolerance in healthy persons.	Elderly and persons with existing disease should stay indoors and avoid exertion. General population should avoid outdoor activity.
300	WARNING	625	1600	34.0	800	2260			
							UNHEALTHFUL	Significant aggravation of symptoms, decreased exercise tolerance in persons with heart or lung disease, and excess disability in healthy population.	Elderly and persons with existing heart and lung disease should stay indoors and reduce activity.
200	ALERT	375	800	17.0	400	1130			
							POTENTIALLY UNHEALTHFUL	Moderate aggravation of symptoms in susceptible persons with irritation symptoms in healthy population.	Persons with heart or respiratory ailments should reduce exertion and outdoor activity.
100	NAAQS	260	365	10.0	160	a			
							SATISFACTORY		
50	50% OF NAAQS	150[b]	180	5.0	80	a			
							GOOD		
0		0	0	0	0	a			

[a]No index values reported at concentration levels below those specified by "alert level" criteria.

[b]Secondary NAAQS.

Reporting the Federal Episode Criteria. When the Federal Episode levels for each pollutant are exceeded, accompanied by meteorological persistence, the administrative actions associated with the Alert, Warning, or Emergency Levels should be reported.

Issuing administrative actions would also apply to the product of TSP and SO_2, which has both Federal Episode Criteria and Significant Harm Levels. While there is no extensive health information to support the use of the descriptor words for the SO_2 x TSP product, it is included in the index for purposes of administrative completeness.

The PSI index has been designed to be as flexible as possible in reporting the status of air quality to the public. Either short or long reports can be used. For television, the report could read, "Today the air pollution index is 50, and the air quality is good." However, when the air quality becomes unhealthful, several possible reports could be considered for television, the news media, or telephone recordings. For example, when oxidant pollution reaches a concentration of 500 $\mu g/m^3$, the report could take several different forms using the information provided in Table V:

1. "Today the air pollution index is 225. The air is 'unhealthful.' The pollutant responsible is oxidant."

2. Repeat the above and add the following cautionary statements: "Elderly and persons with existing heart and lung disease should reduce physical activity."

3. The report could include everything said in (1) and (2) and then add that "unhealthful" air can cause "significant aggravation of symptoms, decreased exercise tolerance in persons with heart or lung disease, and excess disability in the healthy population."

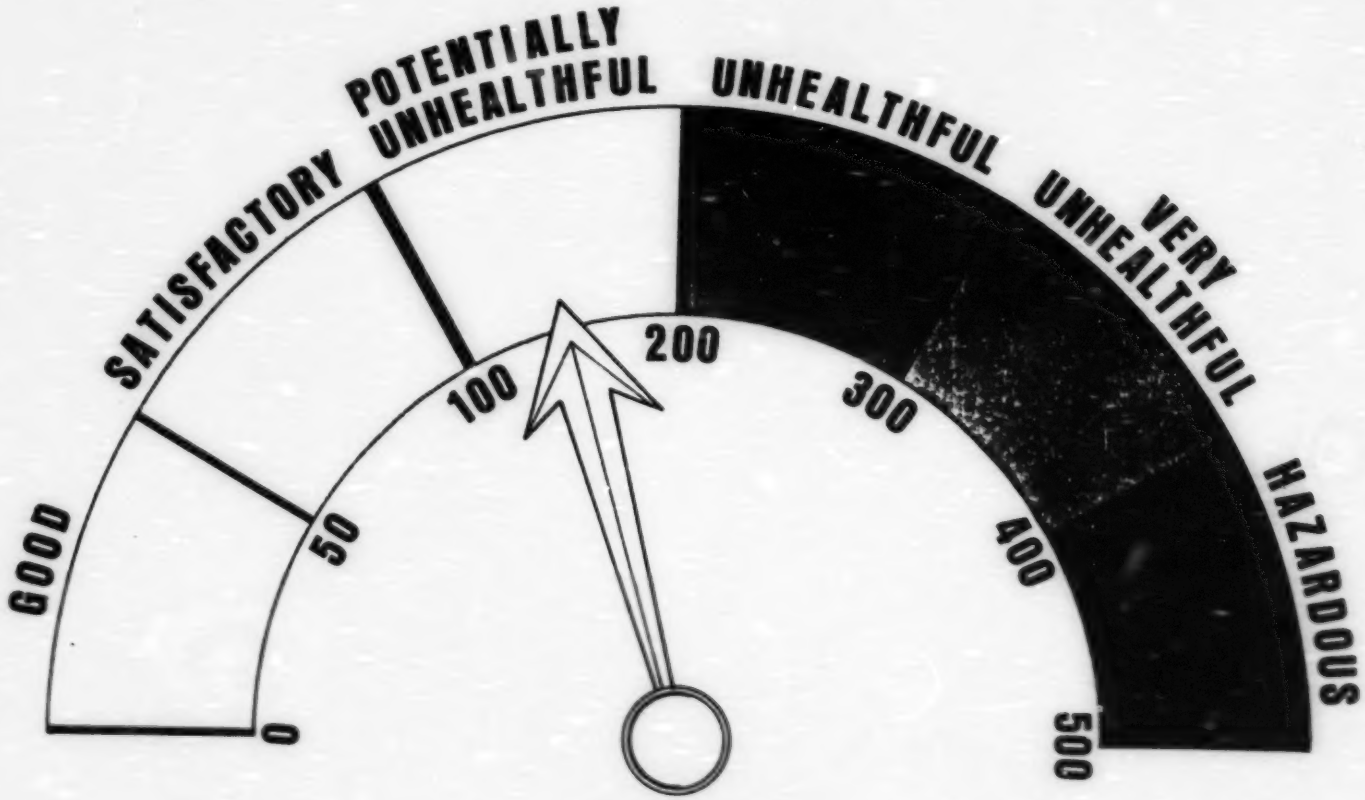
Figure 3 is an example of a possible report for the television and newspaper. It provides essential information, indicating the PSI value, the problem pollutant, and the health implications for the public in an easy-to-understand format. The index also can be used to report data on a long-term basis. An example (Figure 4) shows the distribution of days over the year in Los Angeles which were classified as "good," "satisfactory," "unsatisfactory," "unhealthy," and "hazardous."[22] This conveys information concerning the percentage of time that various categories of air quality levels were measured.

IV. PROSPECTS OF IMPLEMENTATION

In an attempt to bring some uniformity to daily air quality reporting, several States (New Jersey, New York and Ohio, for example) have implemented uniform State-wide air pollution indices.[11] Such indices represent the first large-scale implementation of a uniform index, paving the way for a possible nationwide air quality index.

More recently, other States have considered adopting State-wide indices.[26,27] In addition, several cities and States bordering on States already using uniform indices have shown an interest in adopting uniform indices among themselves to reduce the confusion which arises when the public is presented with two or more different indices. The following is a brief discussion of the status and prospects of implementing a uniform national air quality indicator in these several agencies:

Ohio--Pittsburgh--West Virginia. In the fall of 1974, officials from the three air pollution control agencies in Ohio, Pittsburgh, and West Virginia initiated a series of meetings to discuss the possibility of developing and implementing a common air quality index for their "Tri-State" region.



PSI = 150

PROBLEM POLLUTANT : CARBON MONOXIDE

HEALTH IMPLICATIONS:

RESPIRATORY AILMENT AND HEART DISEASE PATIENTS SHOULD REDUCE EXERTION AND OUTDOOR ACTIVITY.

Figure 3. Example of possible PSI report for television

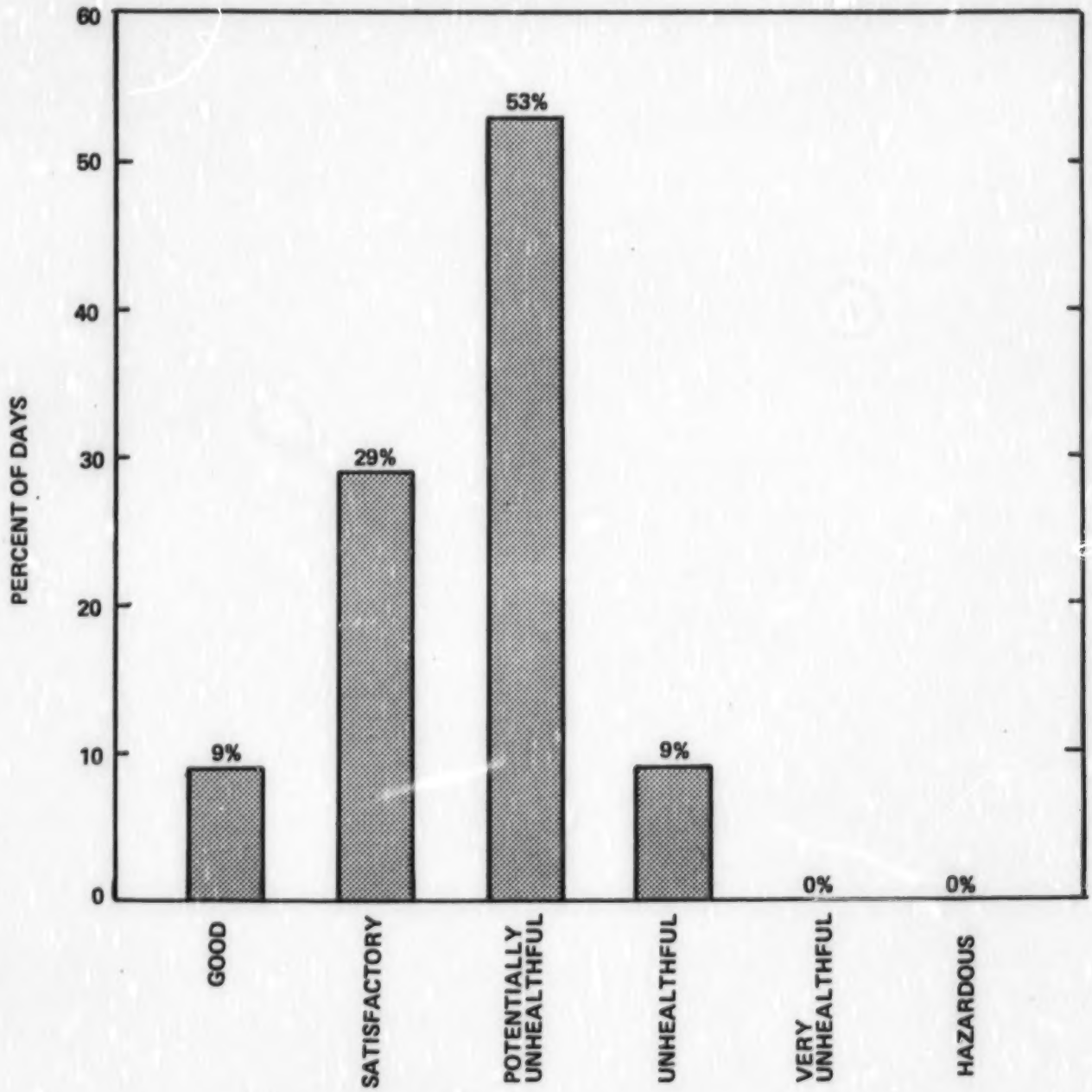


Figure 4. Distribution of PSI descriptor words in downtown Los Angeles for 1974 (Source: Reference 22)

Currently, two different indices are used and disseminated to the public throughout the region. The implementation of a common "Tri-State Air Quality Index" not only would alleviate the public confusion which has resulted from using two indices, but it would help coordinate emission control activities in the region during air pollution episodes.

These meetings, which provided a case study for the Compendium,[11] identified the criteria necessary for a common Tri-State index. The case study showed that each agency felt that any new index implemented in the region should be one which is recommended by the Federal Government. Thus, once a uniform Federally recommended index is selected, implementation in this region should be rapid.

Philadelphia--New Jersey. During 1974, officials from the Philadelphia and New Jersey air pollution control agencies and representatives from two citizens groups held a series of meetings in an attempt to develop a uniform index;[23] each agency was using a different index. Although there was great interest in implementing a uniform index in this region, several problems arose, one of which concerned the index structure: Philadelphia wanted to use only numerical values and no descriptor words, while New Jersey wanted to use descriptor words. As a result of this impasse, Philadelphia developed a new index, which is based on its previous one, and implemented its use in early 1975 (some additional modifications were instituted in early 1976).[24,25] However, officials from both jurisdictions are hopeful that a uniform national index which they can adopt, will be developed and recommended by the Federal Government.

Wisconsin. A State-wide index for internal agency use was implemented in July 1975 by the Wisconsin State Department of Natural Resources.[26] The structure of the index is very similar to PSI, and agency officials have

indicated an interest in adopting a Federally recommended index. Therefore, implementation in this State is virtually assured.

Virginia. In June 1975, the Virginia State Air Pollution Control Board (APCB) requested that its staff study the possibilities of implementing a State-wide index which is similar to the ones currently used in Norfolk and Northern Virginia (Washington, DC, region). The APCB staff member in charge of this study has been kept informed of the activities of the Federal Government and has advised the Board to forego any decisions on implementing a State-wide index until a Federally recommended index is selected; at that time, he will recommend that the APCB adopt the Federal index for State-wide use.[27]

Canada. In 1972, a small working group was set up in the Canadian Federal Department of the Environment to develop an overall Environmental Quality Indicator. In addition, the Federal Provincial Committee on Air Pollution has recognized the need for a common method for releasing air quality data to the public and the development of methods for comparing air quality data from different cities and regions. Thus, in May 1975, an ad hoc subcommittee was established to develop a National Air Quality Index. The progress of the subcommittee is to be reported to the Canadian Council of Resource and Environment Ministers in 1976.[28]

Through the Province of Alberta's representative on this subcommittee, Canadian officials have become aware of the work in the United States.[29] It is hoped that representatives from both countries will meet to discuss the prospects of implementing a uniform index on an international basis.

In summary, the prospect is excellent that several agencies will adopt a Federally recommended uniform air quality index soon after its selection.

Furthermore, inasmuch as several other agencies have indicated an interest in adopting such an index, it is reasonable to assume that a minimum effort would be required to achieve near nationwide implementation of the final index structure.

V. SUMMARY AND CONCLUSIONS

The standard air pollution index, PSI, currently under consideration by the Federal Government has been developed from the large data base established in the Compendium[11] and additional consultation with State and local air pollution control agencies. The structure of PSI, as proposed to the Federal Task Force on Air Quality Indicators by EPA, includes many of the features currently used in existing indices, in addition to health effects descriptor words and phrases associated with various air pollution levels. However, the final PSI may differ slightly from the one presented here as additional improvements are made to meet the user community needs. The prospects of PSI being adopted by a large number of agencies on a voluntary basis appear to be excellent, thus considerably reducing the potential confusion associated with the variety of indices currently in use.

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